

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT: KIM, Sangyum; CHOI, Chang Hee; JO, Cha Jae; KIM, Jeong Ik; WOO, Kyung Nyung; KI, Joon Seo; MOON, Hong Gi

SERIAL NO.:

FILED: Herewith

TITLE: METHOD FOR MANUFACTURING VERY LOW ROUGHNESS  
ELECTRODEPOSITED COPPER FOIL AND ELECTRODEPOSITED COPPER FOIL  
MANUFACTURED THEREBY

Preliminary Amendment: CLAIM AMENDMENTS

1. (Currently amended) ~~In a~~ A method for manufacturing an electrodeposited copper foil comprising: in which a rotating drum and an anode plate which is formed of a curve distanced from the outer surface of the drum by a certain distance are drowned in an electrolyte, said electrolyte consists of a sulfuric acid, copper ion and chloride ion, and the electrodeposited copper foil is deposited on the surface of the drum as a negative current is applied to the drum, and a positive current is applied to the anode plate, a method for manufacturing an electrodeposited copper foil which is characterized in that an additive which consists of a gelatin of 0.1~100ppm, a HEC(Hydroxyethyl Cellulose) of 0.05ppm~50ppm, and a SPS(bis(sodiumsulfopropyl)disulfide) of 0.05~20ppm is added to the electrolyte.

2. (Original) The method of claim 1, wherein the amount of the addition of the gelatin is 2~5ppm.

3. (Original) The method of claim 1, wherein the amount of the addition of the HEC is 1~3ppm.

4. (Original) The method of claim 1, wherein the amount of the addition of the SPS is 0.5~3ppm.

5. (Currently amended) The method of ~~one among claims 1 through 4~~ Claim 1, wherein a roughness of a matte side of the electrodeposited copper foil is larger than a roughness of a shiny side.

6. (Currently amended) The method of ~~one among claims 1 through 4~~ Claim 1, further comprising a post-treatment process.

7. (Currently amended) The method of claim 6, wherein said post-treatment process is ~~formed~~ comprised of one or more than one selected from the steps of:

a nodule process for forming a nodule on one side or both sides of the electrodeposited copper foil for increasing an adhesion with a resin;

a barrier process for preventing a copper from being diffused into a resin layer;

a corrosion resisting process for preventing an oxidation of the electrodeposited copper foil; and

a silane coupling agent process for enhancing an adhesion reliability with the resin.

8. (Currently amended) The method of ~~either claim 1 or claim 2~~ Claim 1, wherein a molecular weight of the gelatin is above 10000.

9. (Currently amended) The method of claim 1, wherein said electrolyte is ~~formed~~ comprised of a sulfuric acid of 50~200g/l, a copper ion of 30~150g/l, and a chloride ion of 200mg/l.

10. (Original) The method of claim 9, wherein a temperature of the electrolyte is 20~80°C.

11. (Original) The method of claim 9, wherein a current density of the electrolyte is 20~150A/dm<sup>2</sup>.

12. (Currently amended) A low roughness electrodeposited copper foil manufactured by one method ~~selected from the claims 1 through 4~~ according to Claim 1.

13. (Original) The foil of claim 12, wherein a roughness of a matte side of the electrodeposited copper foil is larger than a roughness of a shiny side.

14. (Original) The foil of claim 12, further comprising a post-treatment process.

15. (Currently amended) The foil of claim 14, wherein said post-treatment process is ~~formed~~ comprised of one or more than one selected from the steps of:

a nodule process for forming a nodule on one side or both sides of the electrodeposited copper foil for increasing an adhesion with a resin;

a barrier process for preventing a copper from being diffused into a resin layer;

a corrosion resisting process for preventing an oxidation of the electrodeposited copper foil; and

a silane coupling agent process for enhancing an adhesion reliability with the resin.